39. (New) The method according to Claim 37, wherein the ray space data read out by said reconstructing step is data discretely sampled on a line in a (x,u) space according to a sampling rate set by said setting step.--

REMARKS

Claims 1, 3, 4, 10, and 31-39 are pending, with Claims 1, 10, and 31 being independent. Claims 2, 5-9, and 11-30 have been cancelled without prejudice. Claims 1, 3, 4, 10 and 31 have been amended. New Claims 32-39 have been added. Support for the amendments and the new claims can be found in the specification. No new matter has been submitted.

INFORMATION DISCLOSURE STATEMENT

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner's attention is directed to the documents listed on the enclosed Form PTO-1449. These documents were cited in an Office Action issued August 30, 2002 in a counterpart Japanese patent application. Copies of the listed documents are enclosed. A copy of the August 30 Japanese Office Action is also enclosed.

The article entitled "Interactive Operation on 3-D Real Images Using Ray Description" discloses generating an image of a ray space viewed from an arbitrary viewpoint. The reference also discloses high-speed rendering for arbitrary viewpoint image composition at a small data size. More specifically, the article discloses to store, in a table, a position in a ray space corresponding to optimum information to be referred to which was obtained in advance, wherein the position is stored in order to adapt obtained information to data of an area where no structural information is acquired.

The article further discloses interpolating and cutting out ray information using the table. However, the article does not teach or suggest a technique for controlling sampling rate such as a present invention.

The article entitled "Adaptive Texture Mapping: An Image-Based Approach to Time Critical Rendering" discloses realizing high-speed rendering by generating in advance images which have a different resolution from each other, and switching to display one of the images according to moving speed.

In contrast, according to the present claimed invention, when a moving speed of a user in a virtual space or a manipulation speed with regard to an object is inputted, a sampling rate which indicates a distance between pixels read from the image in accordance with the input speed is dynamically controlled. This article does not teach or suggest a technique for dynamically generating images which have a different resolution from each other using a single image, as in the present claimed invention.
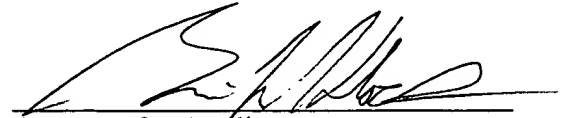
STATEMENT UNDER 37 C.F.R. § 1.97(e)

Each item of information in this information disclosure statement was first cited in any communication from a foreign Patent Office in a counterpart foreign application not more than three months prior to the filing date of this Statement.

Early and favorable consideration hereof is earnestly solicited.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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VERSION WITH MARKINGS SHOWING CHANGES MADE TO THE CLAIMS

1. (Amended) An image processing apparatus <u>for generating an image of a</u> <u>virtual space according to a user's operation using ray space data</u> comprising:

<u>a</u> recording [means for recording image information appended with quantized space information in units of pixels] <u>unit adapted to record the ray space data</u>;

<u>a</u> setting [means for setting a sampling rate] <u>unit adapted to set a sampling rate</u> <u>for ray space data read out from said recording unit according to the user's operation, the</u> <u>sampling rate indicating a distance between pixels to be sampled</u>;

[reconstruction means for reconstructing an image by reading out image information from the recording means in accordance with the sampling rate set by the setting means] <u>a reconstructing unit adapted to read out ray space data from said recording</u> <u>unit according to the sampling rate set by said setting unit, and to reconstruct an image of</u> <u>the virtual space</u>; and

<u>an</u> interpolation [means for interpolating pixels at empty pixel positions to obtain a resolution of an image required for display when the reconstruction means reconstructs the image at a resolution lower than the resolution of the image required for display] <u>unit adapted to interpolate pixels of the image reconstructed by said reconstructing</u> <u>unit until the size of the image becomes a predetermined size</u>.

3. (Amended) The apparatus according to claim 1, wherein the setting [means] <u>unit</u> determines the sampling rate on the basis of the moving speed in a virtual space designated by [a] <u>the</u> user.

4. (Amended) The apparatus according to claim 1, wherein the setting [means] unit determines the sampling rate on the basis of the manipulation speed of an object in a virtual space designated by [a] the user.

10. (Amended) An image processing method for reconstructing an image of a virtual space according to a user's operation using ray space data recorded in a recording means [obtained by recording image information appended with quantized space information in units of pixels], comprising:

a setting step of setting a sampling rate for ray space data read out from the recording means according to the user's operation, the sampling rate indicating a distance between pixels to be sampled;

a reconstruction step of [reconstructing an image by] reading out ray space data [image information] from the [a] recording means in accordance with the sampling rate set in [the] said setting step, and reconstructing an image of the virtual space; and

an interpolation step of interpolating pixels [for empty pixel positions to obtain a resolution of an image required for display when the image is reconstructed in the reconstruction step at a resolution lower than the resolution of the image required for display] of the image reconstructed by said reconstruction step until the size of the image becomes a predetermined size .

31. (Amended) [A storage medium for storing a computer program for a computer implementation of the method of claim 25] A computer-readable storage medium for storing a program which makes a computer function as an image processing apparatus for generating an image virtual space according to a user's operation using ray space data recorded in a memory, the program comprising:

a setting step of setting a sampling rate for ray space data read out from the memory according to the user's operation, the sampling rate indicating a distance between pixels to be sampled;

a reconstructing step of reading out ray space data from the memory according to the sampling rate set in said setting step, and reconstructing an image of the virtual space; and

an interpolation step of interpolating pixels of the image reconstructed in said reconstructing step until the size of the image becomes a predetermined size.

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